al., Nucleosides Nucleotides 12, 1093,1993 and Damha et al., J. Am. Chem. Soc., 120, 12976,1998. The phosphitylation is carried out by using the bisamidite procedure.

EXAMPLE 68

Synthesis of 2'-hydroxyl-β-D-arabinofuranosyl compounds

[0249] 2'-Hydroxyl-β-D-arabinofuranosyl oligonucleotides are synthesized following the procedures by Resmini and Pfleiderer Helv. Chim. Acta, 76, 158,1993; Schmit et al., *Bioorg. Med. Chem. Lett.* 4, 1969, 1994 Resmini, M.; Pfleiderer, W. Synthesis of arabinonucleic acid (tANA). Bioorg. Med. Chem. Lett. (1994), 16, 1910.; Resmini, Matthias; Pfleiderer, W. Nucleosides. Part LV. Efficient synthesis of arabinoguanosine building blocks (Helv. Chim. Acta, (1994), 77, 429-34; and Damha et al., J. Am. Chem. Soc., 1998, 120, 12976, and references sited therin).

[0250] 5'-*O*-DMT-2'-ara-(hydroxy)-3'-*O*-(2-cyanoethyl-N,N-diisopropylamine)-5-methyl uridine-phosphoramidite, 5'-*O*-DMT-2'-ara-(hydroxy)-N-6-benzoyl adenosine (3'-*O*-2-cyanoethyl-N,N-diisopropylamino) phosphoramidite, 5'-*O*-DMT-2'-ara-(hydroxy)-N2-isoburytyl guanosine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite and 5'-*O*-DMT-2'-ara-(hydroxy)-N-4-benzoyl cytidine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidites are obtained by the phosphitylation of the corresponding nucleosides. The nucleosides are synthesized according to the procedure described by Kois,P. et al., Nucleosides Nucleotides 12, 1093,1993 and Damha et al., J. Am. Chem. Soc., 120, 12976,1998. The phosphitylation is carried out by using the bisamidite procedure.

EXAMPLE 69

Synthesis of difluoromethylene compounds

[0251] 5'-*O*-DMT-2'-deoxy-2'-difluoromethylene-5-methyluridine-3'-(2-cyanoethyl-N,N-diisopropyl phosphoramidite), 5'-*O*-DMT-2'-deoxy-2'-difluoromethylene-N-4-benzoyl-cytidine, 5'-*O*-DMT-2'-deoxy-2'-diflyoromethylene-N-6-benzoyl adenosine, and 5'-*O*-DMT-2'-

deoxy-2'-difluoroethylene-N_2-isobutyryl guanosine are synthesized following the protocols described by Usman *et. al.* (U.S. Patent 5639649, June 17, 1997).

EXAMPLE 70

Synthesis of 5'-*O*-DMT-2'-deoxy-2'-β-(O-acetyl)-2'-α-methyl-N6- benzoyl-adenosine-3'-(2-cyanoethyl-N,N-diisopropyl phosphoramidite

[0252] 5'-*O*-DMT-2'-deoxy-2'-β-(OH)-2'-α-methyl-adenosine is synthesized from the compound 5'-3'-protected-2'-keto-adenosine (Rosenthal, Sprinzl and Baker, Tetrahedron Lett. 4233, 1970; see also Nucleic acid related compounds. A convenient procedure for the synthesis of 2'- and 3'-ketonucleosides is shown Hansske *et al.*, Dep. Chem., Univ. Alberta, Edmonton, Can., Tetrahedron Lett. (1983), 24(15), 1589-92.) by Grigand addition of MeMgI in THF solvent, followed by seperation of the isomers. The 2-β-(OH) is protected as acetate. 5'-3'-acetal group is removed, 5'-position dimethoxy, tritylated, N-6 position is benzoylated and then 3'-position is phosphitylated to give 5'-*O*-DMT-2'-deoxy-2'-β-(O-acetyl)-2'-α-methyl-N6-benzoyl-adenosine-3'-(2-cyanoethyl-N,N-diisopropyl)phosphoramidite.

EXAMPLE 71

Synthesis of 5'-*O*-DMT-2'-α-ethynyl-N6- benzoyl-adenosine-3'-(2-cyanoethyl-N,N-diisopropyl phosphoramidite

[0253] 5'-*O*-DMT-2'-deoxy-2'-β-(OH)-2'-α-ethynyl-adenosine is synthesized from the compound 5'-3'-protected-2'-keto-adenosine (Rosenthal, Sprinzl and Baker, Tetrahedron Lett. 4233, 1970) by Grigand addition of Ethynyl-MgI in THF solvent, followed by seperation of the isomers. The 2'-β-(OH) is removed by Robins' deoxygenation procedure (Robins *et al.*, J. Am. Chem. Soc. (1983), 105, 4059-65. 5'-3'-acetal group is removed, 5'-position dimethoxytritylated, N-6 position is benzoylated and then 3'-position is phosphitylated to give the title compound.

EXAMPLE 72

2'-O-(guaiacolyl)-5-methyluridine

[0254] 2-Methoxyphenol (6.2 g, 50 mmol) was slowly added to a solution of borane in tetrahydrofuran (1 M, 10 mL, 10 mmol) with stirring in a 100 mL bomb. Hydrogen gas evolved as the solid dissolved O-2,2'-anhydro-5-methyluridine (1.2g, 5 mmol), and sodium bicarbonate (2.5 mg) were added and the bomb was sealed, placed in an oil bath and heated to 155 °C for 36 hours. The bomb was cooled to room temperature and opened. The crude solution was concentrated and the residue partitioned between water (200 mL) and hexanes (200 mL). The excess phenol was extracted into hexanes. The aqueous layer was extracted with ethyl acetate (3x200 mL) and the combined organic layer was washed once with water, dried over anhydrous sodium sulfate and concentrated. The residue was purified by silica gel flash column chromatography using methanol:methylene chloride (1/10, v/v) as the eluent. Fractions were collected and the target fractions were concentrated to give 490 mg of pure product as a white solid. Rf= 0.545 in CH_2Cl_2/CH_3OH (10:1). MS/ES for $C_{17}H_20N_2O_7$, 364.4; Observed 364.9.

EXAMPLE 73

5'-Dimethoxytrityl-2'-*O*-(2-methoxyphenyl)-5-methyluridine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite

[0255] 2'-*O*-(guaiacolyl)-5-methyl-uridine is treated with 1.2 equivalents of dimethoxytrityl chloride (DMT-Cl) in pyridine to yield the 5'-*O*-dimethoxy tritylated nucleoside. After evaporation of the pyridine and work up (CH_2Cl_2/saturated $NaHCO_3$ solution) the compound is purified in a silica gel column. The 5'-protected nucleoside is dissolved in anhydrous methylene chloride and under argon atmosphere, N,N-diisopropylaminohydro-tetrazolide (0.5 equivalents) and bis-N,N-diisopropylamino-2-cyanoethyl-phosphoramidite (2 equivalents) are added via syringe over 1 min. The reaction mixture is stirred under argon at room temperature for 16 hours and then applied to a silica column. Elution with